

Claims

What is claimed is:

1. A method for compensating for variations in modeled parameters of a plurality of machines having similar characteristics and performing similar operations, including the steps of:
 - establishing a model development machine;
 - obtaining data relevant to the modeled parameters, characteristics, and operations of each of at least one test machine;
 - comparing the data from each test machine to corresponding data of the model development machine; and
 - updating at least one of an estimator and a model of each test machine in response to variations in the compared data.
2. A method, as set forth in claim 1, wherein each of the model development machine and the at least one test machine includes a neural network for modeling a parameter of each respective machine, and wherein updating at least one of an estimator and a model includes the step of updating an estimator for each neural network in response to variations in the compared data.
3. A method, as set forth in claim 1, wherein each of the model development machine and the at least one test machine includes a neural network for modeling a parameter of each respective machine, and wherein updating at least one of an estimator and a model includes the step of updating each neural network in response to variations in the compared data.

4. A method, as set forth in claim 1, wherein obtaining data includes the step of obtaining data from each test machine relevant to operating characteristics of each respective test machine.

5. A method, as set forth in claim 1, wherein obtaining data includes the step of obtaining data from a work site in which a respective test machine is located, the data including data relevant to characteristics of the work site and operations of the test machine at the work site.

6. A method, as set forth in claim 1, wherein obtaining data includes the step of obtaining data relevant to aging of each test machine.

7. A method for compensating for variations in modeled parameters of a test machine compared to a model development machine, including the steps of:

delivering a neural network model from the model development machine to the test machine;

determining a parameter on the test machine;

estimating the parameter on the test machine with the delivered neural network;

comparing the computed parameter with the estimated parameter;

and

updating at least one of an estimator and the neural network model on the test machine in response to variations in the compared data.

8. A method, as set forth in claim 7, wherein determining a parameter includes the step of calculating the parameter.

9. A method, as set forth in claim 7, wherein updating a neural network model includes the step of tuning at least one weight in the neural network model.

10. A method for compensating for variations in modeled parameters of a plurality of machines having similar characteristics and performing similar operations, including the steps of:

collecting data from each of the plurality of machines relevant to the modeled parameters, characteristics, and operations of each respective machine;

determining a level of variability of the characteristics of each machine;

determining a level of variability of the operations of each machine relevant to a respective work site;

determining an aging factor of each machine; and

updating at least one of an estimator and a model of each machine in response to the level of variability of the characteristics of each machine, the level of variability of the operations of each machine relevant to each work site, and the aging factor.

11. A method, as set forth in claim 10, wherein determining a level of variability of the operations of each machine relevant to a respective work site includes the step of determining a level of variability as a function of differences in characteristics between each work site.

12. A method, as set forth in claim 10, wherein determining an aging factor of each machine includes the step of determining a level of variability of operations of each machine as a function of aging of each respective machine.